Dementia and driving

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Summary

Many European countries test cars, but not their drivers, as they age. There is evidence to suggest that human factors are more important than vehicular factors as causes of motor crashes. The elderly also are involved in more accidents per distance travelled than middle-aged drivers. As the UK relies on self-certification of health by drivers over the age of 70 years, we examined the driving practices of patients with dementia attending a Memory Clinic. Nearly one-fifth of 329 patients with documented dementia continued to drive after the onset of dementia, and impaired driving ability was noted in two-thirds of these. Their families experienced great difficulty in persuading patients to stop driving, and had to invoke outside help in many cases. Neuropsychological tests did not help to identify those who drove badly while activity of daily living scores were related to driving ability. These findings suggest that many patients with dementia drive in an unsafe fashion after the onset of the illness. The present system of self-certification of health by the elderly for driver-licencing purposes needs to be reassessed.

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Introduction

Nearly 3 million people over the age of 60 years are licensed to drive private motor vehicles in the United Kingdom, and 680 000 of these are aged over 70 years (personal communication, Driver and Vehicle Licensing Centre (DVLC), April 1990). Drivers over the age of 65 years are progressively more likely to be involved in fatal motor accidents than those aged from 30 to 65 years and involvement in severe crashes increases per unit distance of travel after the age of 60 years[1,2]. Human factors are the most important predisposing factor in motor crashes: a large study in Indiana showed that up to 71% of crashes were primarily due to human error[3]. It is paradoxical that several European countries routinely test vehicles as they age, but either do not test elderly drivers or, as in the case of the UK, rely heavily on self-declaration of illness.

The DVLC issues driving licences until the age of 70: thereafter renewal is on a triennial basis with a declaration of health by the patient. Both relevant disabilities (eg, epilepsy, blindness), and prospective illnesses which by their intermittent or progressive nature may in time become relevant disabilities must be reported. The onus for reporting disability is on the patient. Although the family doctor may liaise directly with the Medical Advisory Branch of the DVLC, after attempting to persuade the patient to inform the DVLC or may involve relatives[4,5], this policy does not take account of the fact that certain disabilities may not be known to family doctors. A further problem is that doctors may be unaware of the driving habits of a substantial proportion of their elderly patients[6].

This state of affairs is particularly unsatisfactory when dealing with drivers suffering with dementia, where insight may be limited[7], early diagnosis difficult[8] and where many cases are unknown to their family practitioners[9]. The problem is aggravated by the high prevalence of dementia in elderly populations, with some estimates as high as 10% of those aged over-65, rising to 20% of the over-85s[10]. Over 80% of those affected live in the community[11]. In addition, a small but important number of younger people also suffer with dementia, and they may be more likely to have family or other passengers in their motor cars. A recent major report on driving and the elderly did not allude to the problem of dementia in this age group[12].

We investigated the driving skills and practices of patients with dementia who continued to drive after the onset of the first symptoms of dementia.

Methods

All patients with a DSM III-R diagnosis of dementia[13] attending the Bristol Memory Disorders Clinic were identified. Their carers were contacted by telephone to determine if they had been driving at the onset of the symptoms of their disease. A questionnaire was administered which requested information on duration of driving, quality of driving, adherence to speed limits, numbers of accidents and whether the patient got lost while driving. The use of retrospective data collected from carers has been validated in several studies[14,15].

Neuropsychological and behavioural data was collected from all patients, either (i) in the last 6 months if the patient was still driving, or (ii) in the 6 months prior to stopping driving in those who had stopped driving. This was possible as patients are followed up at regular intervals at the Memory Clinic. All patients were tested with a neuropsychological test battery including simple cognitive screening tests (Kew and Folstein Mini-Mental State Examination (MMSE)) as well as a test of visuo-spatial ability[16-18]. The Clifton assessment procedures for the elderly behaviour rating scale was used as a behavioural and activity of daily living (ALD) index[19].

Results

Carers identified 57 patients who continued to drive after the onset of symptoms of dementia. The mean patient age was 72±7 years (mean±standard deviation) and there were 41 males and 16 females.

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Table 1. Underlying causes of dementia in study population

	n
Alzheimer's disease	43
Multi-infarct dementia	7
Mixed Alzheimer's disease and multi-infarct dementia	5
Alzheimer's disease with extra-pyramidal symptoms	1
Dementia of Parkinson's disease	1
Total	57

The dementing illness had been present for a mean of 5.2 years and the mean MMSE was 18.7±5.4. The causes of dementia are outlined in Table 1. A minority of patients were taking psychoactive medications: hypnotics (3), thioridazine (3), anti-depressants (2) and L-dopa (1). One patient stopped driving as a result of poor sight.

A marked reduction in driving ability was reported in 40 (65%) of the drivers: in 10 cases (18%) this was one of the first symptoms of the dementing illness. Examples of impaired driving ability included driving the wrong way around roundabouts, up the wrong lane of a dual carriage-way and through the neighbours' front gardens. In three cases, the patient's impaired driving ability had led to attempted prosecution for dangerous driving. In each case prosecution was averted by medical intervention.

Forty-five (78%) drivers had stopped driving after a mean disease duration of 2.7 years. Before stopping, 11 (24%) of this group became regularly lost and 11 (24%) occasionally lost. Thirteen (29%) were involved in motor crashes which the carers felt were related to reduced driving ability: in seven cases there was one accident, in five there were two accidents and in one case three accidents. Twelve (22%) of the drivers continued to drive with an average duration of symptoms of 3.9 years: 50% of these continued to get lost occasionally. Eight drivers consistently exceeded the speed limit while driving.

Analysis of test measures using unpaired two-tailed *t* tests between those adjudged to have a decline in driving skills and those with normal driving skills showed worse ADL scores with diminished driving ability, but similar scores on the mental test scores and the visuo-spatial test (Table 2).

In many cases the decision to stop driving was problematic - it was taken by the patient alone in only 10 cases. In the remaining 35, family members made the decision in 11 cases, family members and the patient jointly in six, the family doctor in eight, the memory clinic in five and the police in one case.

Table 2. Test measures in drivers with diminished and preserved driving ability (mean±SE)

	Preserved driving ability	*Diminished driving ability*	
ADL score	4.3±0.9	7.2±0.8	$P<0.05$
MMSE	18.4±1.3	18.9±0.9	NS
Kew (errors)	4.6±0.9	4.1±0.5	NS
Visuo-spatial task (errors)	4.9±1.1	5±0.8	NS

Discussion

Driving is a complex skill, and even normal age-related deficits in sensory abilities relevant to driving are not appreciated by the elderly[20]. Dementia is characterized by cognitive and perceptual deficits which may interfere with safe driving. Patients with dementia may therefore be doubly compromised: by age-related performance deficits and by the effects of dementing illness. In the most common form of dementia, Alzheimer's disease, these deficits include memory loss, reduction in attention span[21] and difficulties in visual perception, such as disordered scan-paths[22], impaired visuo-spatial discrimination[23] and reduction in visual fields[24]. Our study showed that a significant number of patients with dementia continued to drive despite a significant deterioration in driving performance: deterioration of driving skill was one of the first signs of dementing illness in a significant minority of patients. These findings are in broad agreement with two North American studies on driving and dementia. A recent case-controlled study showed that motor crashes were nearly five times more likely to occur with patients with Alzheimer-type dementia than with healthy age-matched controls[25]. Only 27% of the patients with dementia in this study had stopped driving before a crash occurred, and in 43% of cases at least one crash had occurred prior to cessation of driving. Most crashes involved errors at intersections, with traffic signals or changing lanes. A further study reported that 30% of a sample of patients with various types of dementia reported an accident since the onset of illness: of those continuing to drive, 44% of them regularly got lost while driving[26].

It can no longer be assumed that drivers over the age of 70 are the most suitable persons to report their own health status for driving licence purposes. This does not apply to dementia alone: it is well established that there is significant under-declaration to the DVLC of conditions such as diabetes[27,28] and attention has been drawn to problems with driver licencing with other age-related illnesses such as Parkinson's disease, epilepsy and cardiovascular disease[29-31]. In addition to the lack of insight caused by dementia, there may be other pressures not to report age-related illnesses such as dementia: inability of a spouse to drive means that loss of the sufferer's driving licence may isolate both partners.

Automatic disclosure by family doctors of patients with dementia to driving licensing authorities is mandatory in many states in the United States, but would seem to be incompatible with the practice and tradition of medical confidentiality in the United Kingdom. One solution may be to require a certificate of health from the family doctor at the age of 70 and at each subsequent renewal, as occurs in the Republic of Ireland, Switzerland and Greece[32-34]. An interesting approach is followed in New Zealand where regular medical testing of the over-70 age group is supplemented by a driving test at two-yearly intervals after the age of 76 years[35]. A higher level of medical input into driver licencing may decrease the type of difficulty experienced by carers in this study in trying to stop patients with dementia from driving.

The new requirement to offer screening to those over the age of 75 years may be a useful starting point for an increased medical participation in driver licensing of the elderly[36]. Diagnosis of dementia can be aided by assessment schedules to detect cognitive

impairments[16,17], and the improved recognition of dementia by general practitioners between 1964[37] and 1988[9] is evidence of an increasing awareness of the need to diagnose it.

Should patients with dementia be forbidden to drive?

Drachmann argues persuasively that restrictions on drivers with dementia should be on the basis of driving ability rather than on the basis of a diagnostic label[38]. The disadvantages of the latter approach include the risk of stigmatizing patients with dementia and of limiting the quality of the remaining years of their life. Those with early (and possibly treatable) dementia might be deterred from seeking medical advice if they feel that this might entail loss of their driving licence. It is also possible that certain subtypes of the most common form of dementia, Alzheimer's disease, may present with mild cognitive loss and progress at a very slow rate[7,39].

A graded and flexible approach would be preferable: a medical report could provide the basis for further assessment by interview or by testing[40]. We do not yet know which parameters best indicate driving competence. Our study suggests that an approach which includes a measure of activities of daily living may be more fruitful than pursuit of cognitive measures alone. This may be a starting point for future research. Testing might involve either computer simulation of driving or road tests[29]. Restricting driving licences to daytime only or to certain short journeys may represent an acceptable compromise in certain cases[35]. Withdrawal of a driving licence represents a very serious breach of personal liberty and should not be undertaken lightly[41]. However, there is some comfort for those who travel less than 4000 miles a year: use of public transport and taxis may be more economical than using a personal motor car[42].

The large number of drivers over the age of 70 years, the high prevalence of dementia in the elderly and evidence of impaired driving ability in those with dementia who continue to drive suggest that urgent action is required to reduce the hazards to those suffering with dementia, their families and the general public.

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Forthcoming events

International Congress on the Management of Infection
5-9 April 1992, Amsterdam, The Netherlands
Further details from: Prof A Percival, c/o Miss C Baxter, Gardiner-Caldwell Communications Ltd, The Old Ribbon Mill, Pitt Street, Macclesfield SK11 7PT (Tel: 0625 618507)

Oral Controlled-Release Dosage Forms: Research and Development, Evaluation, Scale-Up, Manufacture, Approval and Marketing
7-9 April 1992, Bristol Hotel Kempinski, Berlin
Further details from: Pharmaceutical Division, Technomic Publishing AG, Missionstrasse 44, CH-4055 Basel, Switzerland (Tel: 061 43 52 26; Fax: 061 43 52 59)

Techniques & Applications of Molecular Biology: A Course for Medical Practitioners
7-10 April 1992, University of Warwick
Further details from: Dr Stephen Hicks, Department of Biological Sciences, University of Warwick, Coventry CV4 7AL (Tel: 0203 52340; Fax: 0203 523701)

3rd International Conference on SLE
13-15 April 1992, Queen Elizabeth II Conference Centre, London
Further details from: Dr Graham Hughes or Mrs Denzil Fletcher, Rheumatology Department, St Thomas's Hospital, London SE1 7EH (Tel and Fax: 071-633 9422)

Registration of Pharmaceuticals in Europe
20-21 April 1992, Nagoya
Further details from: Hilary Pendell, IBC Technical Services, Gilmoora House, 57-61 Mortimer Street, London W1N 7TD (Tel: 071 637 4383; Fax: 071 631 3214)

One Day Course in Practical Arthroscopic Surgery
25 April 1992 (*also 26 April*), Droitwich, Worcs
Further details from: Mrs S Warren, Droitwich Knee Clinic, St Andrews Road, Droitwich WR9 8EA (Tel: 0905 795916; Fax: 0905 723371)

British Association of Oral and Maxillofacial Surgeons: Spring Meeting
25-26 April 1992, Hospitality Inn, Glasgow
Further details from: Mr John Lowry, Honorary Secretary, British Association of Oral & Maxillofacial Surgeons, Royal College of Surgeons of England, 35/43 Lincoln's Inn Fields, London WC2A 3PN (Tel: 071 405 8074; Fax: 071 430 9997)

Reproductive Toxicology
28 April 1992, Scientific Societies Lecture Theatre, London
Further details from: Pauline A Sim, Secretariat, Gascoigne Secretarial Services, 24 Southfield Drive, Hazlemere, High Wycombe HP15 7HB (Tel: 0494 713664; Fax: 0494 714516)

Biomaterials for the 1990s: Polyurethanes and Ion Beam Modification Techniques
4-5 May 1992, Boston, Mass
Further details from: Pharmaceutical Division, Technomic Publishing Company, 851 New Holland Avenue, Box 3535, Lancaster, PA 17604, USA (Tel: 800 233 9936; Fax: 717 295 4538)

Pharmaceutical Technology Transfer: The 1990s and Beyond
7-8 May 1992, Chicago, Ill
Further details from: (see entry for 4-5 May 1992)

3rd Congress of the International Society for Rheumatic Therapy
10-15 May 1992, Mannheim, Germany
Further details from: Mrs M Dathan, Secretariat, Klinik Auerbach, Heinrichstrasse 4, 6140 Bensheiim 3, Germany (Tel: 06251 705149; Fax: 06251 787325)

Nasal Drug Delivery
13-14 May 1992, Boston, Mass
Further details from: (see entry for 4-5 May 1992)

8th Annual Drug Law Symposium: Strategies, Costs and Timing
14-15 May 1992, Brussels
Further details from: (see entry for 20-21 April 1992)

International Conference on the Molecular and Clinical Genetics, Epidemiology and Clinical Characteristics of Childhood Renal Tumors
14-16 May 1992, Albuquerque, New Mexico
Further details from: University of New Mexico, Office of Continuing Medical Education, HSSB, Room 140, Box 713, Albuquerque, NM 87131-5126, USA

25th Annual Advances and Controversies in Clinical Paediatrics
14-16 May 1992, San Francisco, California
Further details from: Extended Programs in Medical Education, University of California, Room LS-105, San Francisco, CA 94143-0742, USA (Tel: 415 476 4251)

Biotechnology-Based Diagnostics: Biosensors, Immunoassays and DNA Probes
18-19 May 1992, Baltimore, Md
Further details from: (see entry for 4-5 May 1992)

Personnel Management Course
20-21 May 1992 (*also 13-14 October*), RCGP, London
Further details from: The Royal College of General Practitioners, Corporate Development Unit, 14 Princes Gate, Hyde Park, London (Tel: 071 581 3232; Fax: 071 225 3047)

6th Annual Symposium on Good Clinical Practice in Europe
21-22 May 1992, Munich
Further details from: (see entry for 20-21 April 1992)

The Pharmaceutical Aerosol: A Drug Delivery System in Transition
25-27 May 1992, Zurich, Switzerland
Further details from: (see entry for 7-9 April 1992)

MRCP Part II Courses
1-5 June 1992, Royal Free Hospital, London
Further details from: Dr D Geraint James, Royal Free Hospital, Pond Street, Hampstead, London NW3 2QG (Tel: 071 794 0500, ext 3931)

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